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**The Larger Boreal American Hesperidæ, including
EUDAMUS, ERYCIDES, PYRRHOPYGE
and MEGATHYMUS.**

BY HENRY SKINNER, M. D., SC. D.

My object in writing this paper is to supply students of the Lepidoptera with a work which will enable them to study and name their specimens. The literature of entomology is so scattered through various publications that it is impossible for any but those having access to large libraries to properly study their material.

It is hoped that the present paper may so cover the ground that the reader will have all required for the purpose of identification. The original descriptions are given in nearly all cases and any other information which appeared to be of value. I had intended to write a monograph but gave up the idea on account of the great amount of synonymy and the necessity of repeating so much already in print. I have considered the species under the old generic names as I consider the unisexual classification in vogue, based on secondary sexual characters, as unscientific and untenable. Those who wish to study these genera can find the desired information in the writings of Dr. S. H. Scudder; Watson in the Proceedings of the Zoological Society of London, 1893; Godman and Salvin, *Biologia Centrali-Americana*; Mabille, *Genera Insectorum*, and H. G. Dyar, *Jour. New York Ent. Soc.*, 13, 111, 1905. They are divided into a multiplicity of genera, almost one to a species. Before the classification can be placed on a scientific foundation it will be necessary to restudy the species from a generic standpoint, omitting characters limited to one sex.

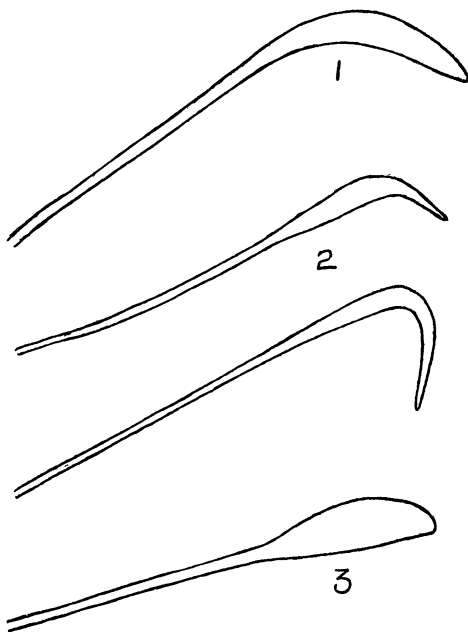
A LIST OF THE SPECIES TREATED.

Electra.	Mexicanus.
Pylades.	Mysie.
Var. <i>immaculata</i> .	Aemilea.
Bathyllus.	Caicus.

Outis.	Albofasciatus.
Hippalus.	Dorantes.
Epigena.	Var. <i>rauterbergi</i>
Drusius.	Urania.
Albociliatus.	Lilea
Melon.	Batabano.
Var. <i>arizonensis</i> .	Amyntas.
Dorus.	Araxes arizonensis.
Lycidas.	Yuccæ.
Cellus.	Var. <i>coloradensis</i> .
Pseudocellus.	Cofaqui.
Euribates.	Streckeri,
Tityrus.	Ursus.
Zestos.	Neumoegeni.
Exadeus.	Var. <i>aryxna</i> .
Idas.	Polingi.
Proteus.	Smithi.
Simplicius.	Stigmaticus.
Eurycles.	

A Key to the Larger North American Hesperidæ.

1. Tails to the hind wings more than one-eighth inch in length.....27.
- Tails to the hind wings less than one-eighth inch in length or absent.....2.



2. Club of antennæ gradually swollen, curved, and apex acute (fig. 1).
araxes.
 Club of antennæ gradually swollen, curved, apex attenuated, often hooklike (fig. 2)3.
 Club of antennæ abruptly swollen, apex blunt, never curved or hooklike (fig. 3).....21.
3. Secondaries above, with a distinct white or yellowish spot...**dorus.**
 Secondaries above, without white or yellowish spot4.
4. Wings above more or less tinged with green or blue; apex of antennal club abruptly attenuated and hooklike,.....5.
 Never as above6.
5. Primaries immaculate; secondaries with a blue submarginal fascia.
batabano.
 Primaries above with a red costal spot**lilea.**
 Primaries above with white translucent maculation; area between veins, green or blue.....**urania.**
6. Maculation of primaries above conspicuous, snow-white.....7.
 Maculation of primaries above large, conspicuous, yellow8.
 Maculation small and white, or tinged with fuscous (rarely wanting in *pylades*)13
 Maculation very obscure or wanting? secondaries distinctly bordered with snow-white**albociliata.**
7. Primaries with, at most, three large spots above not forming a band.....**amyntas.**
 Primaries with at least four large spots above forming a band.
melon.
8. Secondaries with white or silver spot below.....9.
 Secondaries without white or silver spot below.....10.
 Secondaries below black with external area white.....**lycidas.**
9. Large spots on primaries above, coalescing, forming an incomplete band**tityrus.**
 Large spots on primaries above not in contact**exadeus.**
 Abdominal segments distinctly annulated with white.....**idas.**
10. Secondaries above cinnamon-brown with band of small fuscous spots.....**euribates.**
 Secondaries above black or dark brown, without spots.....11.
11. A continuous yellow band from costa to near interior margin above12.
 Band broken into distinct spots by the veins.....**zestos.**
12. Larger, expanding 44 mm., antennal club unicolorous**cellus.**
 Smaller, expanding 39 mm., antennal club with basal annulation of white; band of primaries tinged with orange.
pseudocellus.
13. Club of Antennæ unicolorous14.
 Club of antennæ with basal white annulation19.

14. Fringe of secondaries white.....15.
 Fringe of secondaries tinged with fuscous, never entirely white..16.
15. Area on underside of secondaries from margin to dark band across wing, white irrorated with brown.....**epigena**.
 No such distinct area**drusius**.
16. Primaries with two spots connected with the three costal subapical spots**æmilea**.
 Primaries without spots of this formation.....17.
17. Maculation forming a distinct but broken oblique band.
bathyllus.
 Maculation diffuse, not forming a band, spots mere points.....18.
18. Large species, expanding 38 mm., dark in color; band of secondaries beneath, irregular and margined with black; male with costal fold.....**pylades**.
 Small species, expanding 32 mm., light in color; band of secondaries beneath not margined with black; no costal fold in the male.....**nevada**.
19. Maculation conspicuous, lower spot nearly quadrate....**hippalus**.
 Maculation small, lower spot much longer than broad.....20.
20. Anal angle of underside of secondaries whitish; no tuft of hairs on upperside of secondaries in male.....**moschus**.
 Anal angle not tinged with white; tuft of hairs on secondaries above in male**outis**.
21. Secondaries above dark, immaculate, except margin.....22.
 Secondaries above, maculate.....24.
22. Secondaries below with distinct triangular white spot below centre of costa.....**yuccæ**.
 Secondaries below more or less spotted.....23.
23. Secondaries above without marginal lunules, larger, expanding three and a half inches.....**ursus**.
 Secondaries above with marginal lunules, smaller, long hair on upperside of secondaries in the male**streckeri**.
24. Underside of secondaries with a whitish submarginal band.....25.
 Underside of secondaries without submarginal band.....26.
 Underside of secondaries with incomplete submarginal band of yellowish spots.
 A row of round fulvous spots on upperside of secondaries.
cofaqui.
25. A macular band of large fulvous spots on primaries and secondaries above**neumoegeni**.
 Smaller (48 mm.). Maculations below, more conspicuous.
polingi.

* *Mysie* Dyar is not included in the key as I have no specimen of the species for examination.

26. Secondaries below with a distinct triangular white spot below centre of costa **yuccæ.**
 Secondaries without this spot **cofaqui.**
 27. Thorax and basal area of secondaries clothed with green hairs. **proteus.**
 Not so clothed 28.
 28. Primaries above with distinct spots 29.
 Primaries with or without a distinct narrow band 30.
 29. A distinct white or silvery fascia on underside of secondaries. **albofasciatus.**
 Without such fascia **protillus rauterbergi.**
 30. With costal fold in the male **simplicius.**
 Costal fold absent in the male **eurycles.**

Eudamus (Thorybes) electra Lintner, Can. Ent., 13, 63, 1881.

"Size of small *Nisoniades juvenalis*. Primaries narrower than in *Eudamus pylades* Scudd. ♀. More rounded on the costa, and more oblique on the hind margin. Secondaries rounded, not prolonged on the anal angle as in *E. pylades*, not excavated opposite the cell as in most of the *Nisoniades*. General color dark brown, approaching that of *E. pylades*; the fringes concolorous with the terminal portion of the wings, a little paler at their tips. Primaries with eleven transparent white spots, upon which an ordinary lens shows regular rows of small black scales; the spots, as follows: Near the end of the cell (apparently open) are two spots, separated by the cellular fold and extending to the enclosing veins (subdorsal and median), the upper one twice as large as the lower and prolonged backward superiorly in one or two teeth—the lower one subtriangular in shape; above and in line with these two, in cell 10, is a small elongated spot—the smallest one on the wing, while beneath them and in range, in cell 2, extending from vein 2 to vein 3, is the largest spot on the wing, enlarged superiorly and excavated inwardly. Outside of this discal band of four spots are seven others, bordered by dark brown, and arranged in an irregular curve as follows: in cells 9, 8 and 7, three costo-apical spots oblique to the costa; outside of these, in cell 6, a spot; in cell 5, still nearer the margin, another; in cell 4, a little farther removed from the margin, another—these last three subtriangular in shape; in cell 3, extending from vein to vein, a subquadrate spot, placed farther from the margin, about equidistant with the lower costo-apical spot; these seven spots, commencing at the costa and omitting the fifth, show a regular increase in size. Outside of these transparent spots is a series of obscure dark brown internervular sub-terminal spots which merge into the dark brown shade of the margin. Inside of these spots the wing shows by oblique light a purplish reflection approaching a grape bloom but much more vivid, with the exception of the internal margin and two brown bands of the color of the outer margin and posterior

wings; the bands extend from the subcostal to the internal vein; the outer and broader embraces the discal band of transparent spots in its outer margin, and the other crosses the median vein at its intersection by vein 2; a shade rests also on the base of the wings.

"Secondaries traversed at about their outer third by a narrow obscure brown band, inside of which the wing is dark brown; outside of this band the subterminal series of brown spots of the primaries is continued. Beneath the purplish reflection of the upper surface appears only at the tip of the wing—the median and basal portions being dark brown, concolorous with the secondaries inside of the paler brown band; the obscure intravenular brown spots of upper surface are repeated, and continued on the secondaries; the transparent spots are without the lines of brown scales. The costal vein of primaries intersects the costa nearly opposite the end of the cell; vein 8 reaches the margin at the extreme apex, not below it. Antennæ about one-half the length of the anterior wings, dark reddish-brown, marked inwardly with white at the joints, expanding rapidly into the club (the terminal half of the club lost). Palpi in length about equal to the diameter of the eyes, clothed with thick, bristly, dark brown hairs, some of which are white tipped; apical joint short, conical, projecting a little beyond the hairs. Locklet? black, curving about half way over the eyes. Front of head dark brown. Thorax above and beneath clothed with long brown hairs, concolorous with posterior wings. Abdomen darker brown, reaching only to the pale band of the hind wings. Legs dark brown; the posterior pair have the femur and tibia of the same length, bearing brown hairs, which nearly equal them in length; tibiæ armed with two pairs of spurs; tarsi twice as long as the tibiæ, moderately spinose. Expanse of wings 1.65 in.; length of body 0.55 in."

"Described from a single female received from Mr. W. H. Edwards. The specimen was captured in Hamilton, Ontario, by Mr. J. Alston Moffat, in 1877, in company with another like it, which escaped capture."

This species is only known by the unique type in the collection made by Mr. W. H. Edwards and now owned by Dr. W. J. Holland of Pittsburgh, Pa. Although captured so many years ago none have been secured since, so far as I am aware. I wrote to Mr. Moffat for any information he could give in relation to the insect and received the following reply:

"It is impossible for me to give you any information as to the generic or specific value of *E. electra*, but I can give you a detailed history of the specimen. In that remarkable year (1877) entomologically, the species was captured. The locality where I took it was a very good

place to find 'skippers' and they were unusually abundant. *Pylades* and *bathyllus* were extremely plentiful. Strolling among them my attention was arrested by one unusually black and rich looking; I captured it and saw another one, but thinking it was only a fresher specimen than usual, and being quite green in the business I made no special effort to secure it and so passed on. Next morning when I came to spread it, I found that I had something quite new to me. I do not remember looking for more of them that season. I kept it apart for several years. Prof. Saunders was looking over my collection for the first time, and I directed his attention to it; he said he had never seen anything like it; then I began to prize it. Some time after that I sent it to Mr. Edwards who sent me word it was new, making inquiry about it and wanting to retain it telling me to keep a good lookout in the same locality at the same time of year for more, which I did but without success. I can after this lapse of time only give my impressions of it. To the practised eye, it was conspicuously distinct from *pylades* by its deeper black and richer color; also the smallness of the spots the most of them being quite inconspicuous, mere points; indeed I did not know it had so many until I read of them in Lintner's description. The ground on which I found it is a flat surrounded on three sides by hills, and marsh on the other. Clumps of witch-hazel with open spaces, grass, weeds and ox-eye daisies in season were abundant. It was an excellent hunting ground for many things, but later it was turned into a cow pasture which altered its character greatly. I watched for others for years, and did think it strange that I did not see any more of them. There was but one other collector in that locality and I know he never took any."

Dr. W. J. Holland sends the following in regard to it:

"The specimen of *E. electra* has been carefully examined by me and compared with its congeners. The tips of the antennæ are, as Lintner says of the specimen, partly wanting but the tips of the palpi are all right. There is enough, however, to make it plain that the insect is congeneric with *bathyllus* and *pylades* and not with *Nisoniades juvenalis*. It is a very well marked and distinct species. It differs wholly from the others of the group in which it belongs in general aspect, and would be detected at a glance as different from any of them."

Dr. Holland kindly sent me a drawing of the species. I have no opinion to offer in regard to it and have given all the information about it in my possession. Time alone will tell whether this is a valid species or only an aberration.

Habitat.—Hamilton, Ontario, Canada. Early stages unknown.

Eudamus (Cocceius) pylades Scudder; Proc. Bost. Soc. Nat. Hist., 13, 207, 1870.

"Mr. Scudder also stated that the butterfly described by Dr. Harris in his State Report as *Eudamus bathyllus*, a name invariably accepted by subsequent writers, was not the species originally described and figured by Abbot and Smith under the same specific name; he therefore proposed to call Harris's species *Eudamus pylades*."

Description of (*bathyllus*) *pylades* by T. W. Harris in Ins. Inj. to Veg. (Flint's Edt.), p. 312.

"It is of a dark brown color; on the fore wings is a row of small white spots across the middle, and another shorter row of only three or four contiguous spots between the first and the tip; the wings beneath are light brown, shaded at the base with dark brown; the hinder pair with a slightly prominent posterior angle, and two dark brown transverse bands. Expands from $1\frac{1}{2}$ to $1\frac{7}{10}$ inches.

Habitat.—Vanc. Isld.; Ont.; Quebec; Cala., Colo., Texas; Dak.; Maine to Fla.

Records.—Mt. Graham, Arizona, H. K. Morrison; Senator, Arizona; Cazadero, Sonoma County, California, April 23d; Philadelphia, Pennsylvania, May 30th, July 2nd; Grinnell, Iowa; Tiger Mill, Texas, March 28th, April 7th; Round Mountain, Texas, July 24th; Wilmington, North Carolina, April 26th; Salt Lake City, Utah, June 6th; Nashville, Tennessee, July 17th; Cloudcroft, New Mexico, May 21st, 27th; Potsdam, New York, June 19th; Johnston, Rhode Island, June 17th; Cumberland Mills, Rhode Island, June 10th; Mississippi.

Food plants.—*Trifolium pratense*, *Lespedeza capitata* and *L. hirta*, *Desmodium dillenii*.

"*Caterpillar*.—Last stage. Head generally pitchy black, sometimes varying to dark amber, densely covered with short whitish or hoary hairs which give it a fuzzy appearance, mounted on minute papillæ, arranged to some extent in longitudinal rows; mouth parts and ocelli black; the first joint of antennæ pale, the others dark red, the bristle very long and hyaline. First thoracic segment black, below on the sides reddish, in front edged with red or orange merging with the black, covered, as is the rest of the body, with small, short, rather stout bristles. Body behind this rather dark green with three stripes; a narrow, dark brownish green, interrupted, dorsal stripe, a similar lateral stripe of a dull salmon or flesh color, and along the basal fold

an infrastigmatal band similar to the last but paler and indistinct anteriorly; between the two lower stripes the body is profusely spotted with more or less raised papillæ of a pale salmon color, the larger and higher distinct, the others less so, each bearing a hair similar to those on the head; marked also with a good many clustered, raised, black points between the wartlets, very abundant on the terminal segments; on the dorsal portion of the body the colors and markings are similar, but the salmon colored warts are more distinctly and highly colored, infringe more upon the dark green (which itself is hardly so dark) and are surmounted, as sometimes below, with a white or pellucid centre from which arises a white or pale brown bristle; on the terminal segments these bristles are nearly all dark brown and the black points are rather also profuse. Raised border of the spiracles black, the inner edge pale brown, outside a little paler. Basal joint of the first thoracic legs pale or colorless, the rest black edged, especially interiorly, with pale; claw blackish, other thoracic legs pale dirty yellowish; the last joint a little fuscous; claw blackish. Prolegs pale brownish yellow with an olivaceous tinge like the underside of the body; claws castaneous. Length, 28 mm.; breadth, 5 mm.; breadth of head, 4.1 mm."

"*Chrysalis*.—Colors almost entirely black and fusco-luteous or olivaceous livid. Head black, considerably mottled above with pale reddish luteous, with numerous short, curving, vinous hairs, clustered on the black spots, especially on the eyes, the mandibles and the extreme front; tongue at base luteous, edged broadly with black, just beyond black, transversely ridged with luteous, apical half fuscous; antennæ blackish fuscous, transversely marked with luteous. Prothorax like the prothoracic stigmata velvety black. Thorax above luteous marked with blackish dots and curving streaks formed of collected dots, each giving rise to a lustrous, pale, vinous hair, the streaks more abundant along the sides of the hinder edge of the mesonotum and just behind the middle of the same portion; wings fusco-luteous, marked with frequent, slender, transverse, irregular streaks of blackish fuscous, mainly following the veins. Legs like the antennæ. Abdomen sparsely haired; four basal joints pale, bespecked with black, the specks on the middle and posterior half mingled into transverse, partially associated patches; the concealable parts of the following segments are pale, unspecked; the other parts black above dotted in a transverse row with luteous. Base of cremaster black above; the rest very dark mahogany; hooks castaneous. Spiracles reddish luteous in the centre edged with a rim of black. Length (including cremaster), 19.5 mm.; height at first abdominal segment, 6 mm.; breadth at third abdominal segment, 6.25 mm.; length of cremaster, 1.75 mm."

Eudamus pylades immaculata n. var., male.

This specimen was taken at Philadelphia May 30th, and is devoid of markings on the primaries.

Godman and Salvin in the *Biologia Centrali-Americana* erect a new genus for this species as follows: "*Cocceius* Nov. Gen. *Eudamus pylades*, which we make the type of this genus, has been usually placed with *bathyllus* in the genus *Thorybes*, but the presence of a costal fold to the primaries of the male indicates its true relationship is rather with *Achalaurus* (*lycidas*). From the latter genus it differs in the shape of the secondaries, which are much more rounded at the anal angle." I have given the description of the above described genus, as the costal fold is the surest means by which we can separate the two species *pylades* and *bathyllus*, the latter not having a costal fold in the male. It seems rather odd to put two species so closely related in separate genera, as they are much nearer each other than *pylades* is to *lycidas* or *drusius*, the latter also being placed in *Cocceius* by Godman and Salvin. Dr. Herman Strecker in his Catalogue did not even consider *pylades* and *bathyllus* different species. We badly need anatomical studies in the Lepidoptera but the value of the costal fold as a generic character is extremely problematical as it is common in many species of the old genus *Eudamus* and is also found in *Nisionades* and *Pholisora* and many other genera in the family *Hesperiidæ*. It is folly to use even anatomical characters to form genera when the significance of these characters is entirely unknown and related and unrelated species associated together by a single secondary sexual character.

***Eudamus* (*Thorybes*) *bathyllus* Sm.-Abbot, pl. 22, 1797.**

"Expanse of wings, 1.4 to 1.5 inches. Upper surface dark brown, about the same color as *E. pylades* with the spots enlarged. The spots in the middle of the costa of the fore wings are connected with one in the cell that extends from the sub-costal to the median vein, hour-glass shaped, sometimes separated in the middle into two triangular spots. These are in line with two of the three spots below, forming a triangle, the one in the second median interspace and the one below the lower branch of the median, the spot in the first median interspace and the one below the lower branch of the median, the spot in the first median interspace being outside the line. The middle one of these last three spots is as large as the one in the cell, but is not so much constricted in the middle; the upper is next in size, and the lower one is small. The anteapical series consists of three quadrate,

white, hyaline spots with a white spot next the costa. Hind wings without spots, but with some brown clouding in the middle. Fringes pale gray, brown at the base, cut with brown at the ends of the veins on the fore wings. Underside as in *E. pylades*, except that there is more gray on the hind margin of the fore wings, and the white spots are larger than in that species, being a little larger than on the upper side. Body and head above concolorous with the wings; below grayish, head and palpi whitish."

This species does not have a costal fold in the male.

Food Plants.—*Rhynchosia tomentosa* Torr. and Gray; *Tephrosia ambigua* Chapm., *Centrosema virginianum* Benth.

"*Caterpillar*.—Last stage. Head black, minutely scabrous, covered with a dense pile of golden brown or tawny hairs with a few intermingled black ones, the median suture rather deeply impressed above. Ocelli, jaws and antennæ all piceous, as well as the neck. Body dull mahogany brown tinged with luteo-olivaceous, profusely sprinkled with dirty, pallid wartlets, each giving rise to a very short, scarcely tapering, minutely clubbed hair, generally luteous, often black or tipped, the black ones most abundant in the posterior part of the body. There is a very faint and narrow, dusky, dorsal line, and a faint supra-lateral line scarcely lighter than the ground. Dorsal shield of first thoracic segment dull black, the softer integument in front and behind is pallid, with no sign of any brighter tint. Spiracles black. Legs black. Prolegs color of body. Length of body, 23 mm.; breadth of same, 4.5 mm.; breadth of head, 4.5 mm. It differs from *pylades* in its generally darker color, in the color of the soft integuments of the first thoracic segment, and appears to be more scabrous.

"*Chrysalis*.—Dull greenish brown, the eyes and appendages with the posterior edges of the abdominal segments, the basal wing tubercles and the veins of the wings marked with fuscous brown; a few dots of the same along the posterior margin of the wing cases. It is stouter bodied than *T. pylades*. Length, 23 mm.; height, 7.5 mm. After a colored drawing by Abbot."

Habitat.—Miss. Valley to Ill.; Wisc.; Iowa; Kansas to Fla.; N. Mex.; Ariz.; Tex.; Mex.; Cent. Am. Also in New England, Conn, and Mass.

Records.—Camden and Cape May, New Jersey, August; Philadelphia, Pennsylvania; North Carolina; Tipton, Georgia, April 24th; Nashville, Tennessee, July 30th.

Bathyllus and *pylades* have been much confused in collections. The males of *pylades* are readily known by the costal fold of the primary wings. The character of the band of

translucent spots in *bathyllus* has been found constant in the many specimens I have examined, and differs considerably from *pylades*. The fringes, palpi and undersides of antennæ in *bathyllus* are comparatively lighter in color, and the brown bands that cross the wing on the underside of the secondaries are more uniform in character, their edges not being nearly so serrate or ragged as in *pylades*. The spots on the primaries, the fringes, palpi, undersides of antennæ, and the bands on secondaries beneath if studied conjointly will enable the student to readily separate these two species in either sex.

Eudamus (Thorybes) mexicanus Herrich-Schaeffer.

Eudamus (Thorybes) *nevada* Scudder, Rept. Peabody Acad. Sci., 1871. (Syst. Rev. Am. Butt.)

“Closely allied to *T. bathyllus*, but measuring only 34 mm. in expanse of wings. The under surface of hind wings is very delicately marbled with fine short transverse lines, giving the outer half of the wing a hoary appearance: in the lower half of the wing one may distinguish rudiments of two darker bands at about two-fifths and three-fifths the distance from the base, the inner one reaching to the middle of the wing. Sierra Nevada, California (Henry Edwards).”

There seems to be considerable doubt as to what *E. nevada* really is. Dr. Strecker in his Catalogue (1878) puts it as a synonym of *pylades* which he erroneously considered a variety of *bathyllus*. Mr. W. H. Edwards in his Catalogue (1884) gives the localities as Texas, Arizona and Colorado, not mentioning the locality from whence came the types. Godman and Salvin in the *Biologia* say: “The loan of the type of Herrich-Schaeffer’s *Eudamus mexicanus*, enables us to state that it agrees with a series of specimens in our collection from Mexico and Western North America, the latter sent to us by Henry Edwards and Mr. Strecker under Mr. Scudder’s name *T. nevada*.” The *Biologia* further gives the following synonymy:

Thorybes mexicanus Biol. Cent-Am., p. 334, tab. 80, figs. 15, 16, 17 ♂.

T. mexicanus Herr-Schaeff. Prodr. 3, p. 68, 1868.

T. nevada Scudder, Rept. Peabody Acad. Sci., 1871.

T. ananius Plotz, Stett. Ent. Zeit., p. 99, 1882.

Mr. Scudder's description is inadequate to identify this species or variety, and it is therefore in some doubt. Mr. Scudder sometime ago kindly sent me one of his two types of *nevada*, but it was in such poor condition that I could make little out of it.

Additional material from the United States and Mexico leads me to consider the synonymy in the *Biologia* to be correct.

Records.—Mt. Graham, Arizona; Cloudcroft, New Mexico, May 27th; Silver Lake, Utah, July 12th; City Creek Cañyon, Utah, July 15th; Colorado; Popocatepetl Park, Mexico, 8100 feet, Sept. 17th, P. P. Calvert; Real del Monte, Hidalgo, Mexico, August 30th; Uruapan, Mexico.

Eudamus (Phaedinus) mysie Dyar.

Eudamus (Thorybes) mysie Dyar, Journ. N. Y. Ent. Soc., 12, 40, 1904.

"*Male*.—Without costal fold, anal angle of secondaries scarcely at all produced, wings broad, trigonate. Fuscous brown, fore wings with whitish subhyaline spots; one in the end of cell, constricted or divided, a subcostal one above it; two subapical, one between veins 6 and 7 beyond these, one between veins 5 and 6, another between 4 and 5 still further out, the upper one sometimes wanting; a large one between veins 3 and 4 less far out, a still larger one between veins 2 and 3 slightly constricted and in an oblique line with the spot in the cell and on costa; a small one below vein 2 still further out and forming part of this straight line of spots, sometimes wanting. Fringe light fuscous. Fore wings below with the spots repeated, margins washed in purplish and spotted fuscous. Hind wing purplish fuscous, two submacular bands of brownish black edged, conjoined spots, the outer followed by a diffuse light band. Expanse 37 to 40 mm."

"Described from two specimens, Patagonia Mountains, Arizona (E. J. Osler). Type.—No. 7737, U. S. National Museum.

Allied to *T. mexicanus* Herr-Schaeff., and with much the same style of markings. It is, however, larger, without dark edging to the pale spots which are less whitish and the underside of the hind wings is marked much as in *Phaedinus caicus* Herr-Schaeff., with distinct, well contrasted markings, not in the obsolete manner of *T. mexicanus*."

Eudamus (Thorybes) æmilea Skinner, Ent. News, 4, 64. 1893.

"*Male*.—Expands $1\frac{1}{4}$ inches and the ♀ $1\frac{1}{2}$ inches. Wings are a gray-brown similar to *E. bathyllus*, yet when compared with the latter species there is a marked difference in color; yet it is almost impossible to describe it in words. There is a somewhat light and grayer area in the middle of the secondaries of *æmilea*. Upperside.—Primaries: In three specimens there is a white dot near the outer end of the discoidal cell, and in two specimens there are two of these white spots; there is a crooked row of white spots running across the outer third of the wing from the costa nearly to the interior margin. First come the three nearly united spots, which are present in so many species; then below these and further toward the exterior margin are two others, the lower one of the two points toward the tip of the wing; then further toward the base is another spot, and below this and still further toward the base is a spot made up apparently of two coalesced; below this and outward, nearer the exterior margin is the last spot, which is usually square in shape. In one male the coalesced spot is nearly obsolete; the inferiors are immaculate. The wings are edged with a narrow black border, and the fringes are grayish; some of the hairs from the black border run through the fringes, from the wings, giving the edge of the wings a scalloped appearance.

"*Underside*.—The spots above are repeated beneath; the wings beneath are much lighter in color, and the inferiors have two black bands running across them.

"This is a smaller species than *bathyllus* and is a different color; it wants the inner costal spots found in *bathyllus* and *pylades*, and leaving out the inner costal and discal spots it has eight spots remaining, and none of the allied species have this many. That it is a new species is apparent to the eye, but it is one of those difficult things to picture in words. From five specimens, two males and three females, taken by Prof. Edw. T. Owen, at Fort Klamath, Oregon, I take pleasure in naming the species after the wife and eldest daughter of Prof. Owen."

It is possible that this may eventually prove to be the same as *mexicanus* or *nevada*.

Habitat.—Fort Klamath, Oregon. Life history unknown.

This form or race may be distinguished from *mexicanus* by the heavier and larger translucent spots, and the fact that it has two additional spots below the three costal spots found in this form and in *mexicanus*.

Records.—Fort Klamath, Oregon, June 4-23; Yosemite, California; Lundy, California, July 19th. Fort Klamath has an elevation of 4150 feet.

Eudamus (Phaedinus) caicus Herr.-Schaeff., Prodr., p. 68, 1868.

Eudamus moschus Edwards, Papilio, 2, 141, 1882.

Eud. schaefferi, Plotz, Stett. Ent. Zeit., p. 99, 1882.

The above synonymy is given by Godman and Salvin in the Biologia Centrali-Americana with the following explanation: "Dr. Standinger has kindly lent us a specimen of this species which bears the name *Eudamus caicus* Herr.-Schaeff. with the type of which it has doubtless been compared. It agrees with a series of examples we possess from Guatemala and Southern Mexico, but those from our Northwestern frontier are rather paler, the palpi are whiter, and the hyaline spots of the primaries are larger. The latter probably belong to Mr. Edwards' *Eudamus moschus* from Arizona. We hesitate to separate them from the darker more southern form, especially as the male genitalia do not differ in any way."

My Mexican specimens do not differ materially from the large series of Arizona specimens in my possession.

"*Male*.—Expands from 1.3 to 1.7 inch. Upper side very like *hippalus*. Glossy brown, with nine whitish, semi-transparent spots on primaries, of which four are subapical on costa, three across discoidal and median interspaces, in an oblique line, one in cell and another above this; these spots are all small, and those in the cell and lower median interspace are much smaller than in *hippalus*; fringes of primaries whitish-brown, except at outer angle; these as in primaries. Underside of both wings brown, mottled with dashes about apex of primaries, and crossed by two black bands, and a demi-band on secondaries is nearly as dark as the bands, and the margin is gray, but usually the contrast is decided between the ground and bands; the spots of primaries repeated. Body above dark brown, beneath thorax gray-brown; abdomen same (in some cases light, with a dark ventral line); legs yellow-brown; palpi yellowish, with brown hairs; antennæ black above, luteous beneath; club black above, yellow beneath; the tip ferruginous.

"*Female*.—Expands about two inches. Similar to male. From 6 ♂s and 6 ♀s from Arizona."

This species was taken abundantly in Arizona by H. K. Morrison in 1883.

Habitat.—Arizona; Sonora, Orizaba, Acaguizotla, Mexico; Polochic Valley, Duenas, Guatemala.

Eudamus (Cogia) outis Skinner, Ent. News, 5, 332, 1894.

"This species is somewhat smaller than *bathyllus*, but in color comes closer to *moschus* and *hippalus*. If the recent subdivisions of the genus are accepted it would go in the genus *Cogia* along with *hippalus*. It expands one and three-eighths inches (distance from middle of thorax to apex of wing doubled). The superior wings have the same translucent white spots common to this section of *Eudamus*. There are three of these spots on the outer third of the costa, and a small point below and toward the outer margin. In the centre of the costa is a linear spot which runs parallel to the costa; below this and not in line, is another spot; the eighth and last spot is in the centre of the outer half of the wing. In one specimen the discal spot is divided. The inferiors are immaculate, and have a small tuft or pencil of hairs arising from the base of the abdominal fold. Fringes cinereous. Underside: Superiors with the same translucent spots as above. Inferiors as in the other allied species. It may readily be distinguished from the other species of *Eudamus* (except *hippalus*) by the tuft of hairs on the secondaries. Differs from *hippalus* in not having the characteristic white fringes of inferiors and is a much smaller species—being only about one-half the size.

Described from four males from Round Mountain, Blanco County, Texas, Aug. 27, 1894.

Types in collection of the Academy of Natural Sciences of Philadelphia.

Females have subsequently been received and are a little larger than the males and lack the abdominal tuft which is a male character."

Eudamus (Cogia) hippalus Edw., Papilio, 2, 27, 1882.

"*Male*.—Expands 1.6 inch. Upperside glossy-brown; primaries have at three-fourths the distance from base to apex, four minute, whitish, semi-transparent spots on costal margin, three of them in perpendicular line, the fourth a little outside; a similar spot in lower discoidal interspace, a small rectangular spot in upper median a large rhomboid in lower median interspace; these three in an oblique line; a bar across cell just above the rhomboid, and above cell a dash nearly parallel to costal edge; fringes of primaries alternately fuscous and

dull white, the dark shade prevailing at apex, of secondaries white with short brown hairs at ends of the nervules, but which do not entirely cross the white. Underside brown, much dusted with gray scales, especially over secondaries and at apex of primaries; inner margin of primaries yellowish; secondaries crossed by dark bands, one on disk, the other beyond; there is also a demiband near base; the spots of primaries repeated and a little enlarged, and in addition there is a light brown patch lying between the outer spots and opposite cell. Body brown above, beneath thorax gray-brown; abdomen whitish, with a brown line in venter; legs gray-brown, the outside of tibiæ white; palpi white with brown hairs; antennæ black above, annulated with yellow beneath; club black above, yellow beneath, and above also at base, tip ferruginous."

From two males taken at Tucson and at Prescott, Arizona.

Habitat.—Southern Arizona; Mexico.

Food plants unknown.

"This species has in the male a small tuft or pencil of hairs arising from the base of the abdominal fold of the inferior wings, and has therefore been placed in the genus *Cogia* of which *C. cajeta* Herr.-Schaeff. is the type." (Godman and Salvin in the *Biologia Centrali-Americana*.)

Records.—Mt. Graham, Arizona (H. K. Morrison); Organ Mountains, New Mexico, Aug. 30th (C. H. T. Townsend).

Eudamus (Rhabdoides) epigona Herr.-Schaeff., Prodr. 3, p. 59, 1868.

Eud. epigena Butler, Tr. Ent. Soc., Lond., 4, 493, 1870.

"Wings above, dark brown; front wings with a spot at the end of the cell, three placed obliquely between the median branches, one below the first median branch and near outer margin, and three together in oblique line near the apex, fringe gray; hind wings with white fringe. Front wings below, paler, excepting within the cell and from the cell to the costa, which is dark brown; apical area hatched with dark brown, hyaline spots as above; hind wings almost exactly as in *E. orion*; body dark brown. Expanse of wings, 2 inches, 1 line."

Food plants unknown.

Habitat.—Arizona; Southern Texas; Mexico; Guatemala.

Eudamus (Cocceius) drusus Edw., Can. Ent., 15, 211, 1883.

Cocceius drusus Godman and Salvin, Biol. Cent.-Am., 2, 336, 1894.

"*Male*.—Expands 1.7 inch. Upperside glossy dark brown, with eight minute semi-transparent spots on the primaries, four of them subapical on costal margin, three in discoidal and median interspaces,

one at right angles to the lowest of the three, in submedian interspace towards hind margin, one in cell; fringes of primaries fuscous, at inner angle cinereous; of secondaries white, cinereous at outer angle. Underside dark brown, the hind margins lightly dusted with whitish scales; the spots on primaries repeated, a little enlarged; secondaries crossed by two obscure bands, with black outlines. Body above dark brown, beneath dark gray-brown; legs gray-brown; palpi either dark gray, or with so many brown hairs as to nearly conceal the whitish ones; antennæ black above, beneath finely annulated with luteous; club black above, luteous below.

“*Female*.—Expands 1.7 inch. Similar to the male. This species is near *moschus* Edw. It has the spots fewer in number, smaller, and differently disposed; beneath is darker, and the bands on secondaries are indistinct; abdomen below without ventral line; legs and palpi different color, the latter in *moschus* yellow.”

Taken in Southern Arizon by Mr. Morrison in 1883.

Habitat.—Southern Arizona; Sonora, Mexico.

Eudamus (Murgaria) albociliatus Mabille.

Mabille, Pet. Nouv. Ent., 2, 162, 1877; Ann. Soc. Ent. Belg., 21, 25, 1878.

Biologia Centrali-Americana, 2, 333, 1894, pl. 80, figs. 12, 13, 14.

Eudamus coyote Skinner, Can. Ent., 24, 164, 1892.

“*Teleg. albociliatus*. Wings black with a dirty fringe and an antecellular band of fuscous spots hardly perceptible which proceeds from the costa as far as the internal margin.

“Hind wings immaculate, with a broad snow-white fringe. Below, the front wings are paler with the antecellular black band described and a reddish internal angle. Hind wings black with two transverse discal black bands not touching the anal space and obsolete at the anterior margin. Colombia, Panama, Guatemala. In collection of Paris Museum, Royal Museum of Belgium and P. Mabille. This species is to be referred to the true *Æthillos*.”

Habitat.—Texas; Mexico; Cent. America; South America.

Records.—Alta Mira, Mexico, July 14th; Kerrville, Texas, July (Dr. Wm. Barnes); near Corpus Christi, Texas (S. F. Aaron).

Eudamus (Heteropia) melon Godman and Salvin.

Godman and Salvin, Biologia Centrali-Americana, 2, 296, 1893, 4, 76, figs. 26, 27.

Var. *arizonensis* Skinner, Ent. News, 16, 232, 1905.

“We have specimens of *melon* from Colima, Mexico, that agree perfectly with the figures in the Biologia. The speci-

mens of var. *arizonensis* were taken by Mr. O. C. Poling in the Baboquivari Mountains, Pima County, Arizona, July 15th to 30th, and differ from typical *melon* in having the marginal border of the secondaries below (outer third of the wing) very much whiter."

Melon is found in Western Mexico: State of Vera Cruz and Montagua in Guatemala.

Eudamus (Plestia) dorus Edw., Papilio, 2, 140, 1882.

Plestia dorus Godman and Salvin, Biol. Cent.-Amer., Rhop., p. 290, tab. 76, figs. 8, 9 ♂.

Dorus Edw., Papilio, 2, 140, 1882.

"*Male*.—Expands 1.6 inch. Upperside dark brown, with whitish semi-transparent spots; primaries have three small subapical spots on costa, a dot below just these, towards hind margin; three large spots in the median and submedian interspaces, in a line parallel to hind margin; a small spot near middle of costa, a large patch under this, in cell, and a large subrectangular spot at origin of lower median interspace; secondaries clothed with long, dark-gray hairs, across disk a line of four whitish spots; fringes of primaries dark cinereous, alternating with brown; of secondaries light cinereous, but next anal angle brown.

"Underside brown, the inner margin of primaries yellowish; the spots repeated, enlarged, and more or less confluent on primaries. On secondaries the spots are much dusted with brown scales; both wings much covered with whitish or bluish-white scales, especially dense on apical area of primaries and over outer limb of secondaries, but nearly as dense at base of these last; secondaries have two blackish transverse narrow bands, the outer one in line with the spots, the outer half-way from this to base, and the two are connected by a broad ligament of same color on underside of cell; near base three small brown patches. Body above brown, underneath gray-brown; legs brown, annulated white; palpi white with many gray hairs on upper part; antennæ black, annulated on underside with white; club deep ferruginous, white on underside.

"*Female*.—Expands 1.7 inch. Like male; the spots rather larger."

Graham Mountains, Arizona.

Habitat.—Arizona; New Mexico; North. Sonora, Mexico.

Records.—Carr Cañon, Huachuca Mountains, Arizona, August (Skinner); Mt. Graham, Arizona (H. K. Morrison); Cloudcroft, New Mexico (Viereck).

Eudamus (Achalaorus) lycidas Sm.-Abb., Ins. Ga., pl. 20, 1797; Bdl.-Lec., Lep. Am. Sept., t., 71, 1833; Scud., Butt. East., U. S. and Can., 2, 1418, pl. 9, fig. 11.

“Expanse of wings from 1.9 to 2 inches. Upper surface dark brown, slightly yellow tinted, with a purple reflection along the costa. The fore wings are crossed from near the middle of the costa in a direction towards the posterior angle by a yellow band of spots, consisting of the same spots as are found in *E. bathyllus*. The spot in the cell and the one in the second median interspace are greatly enlarged, so as to be nearly or quite quadrate; the others also are enlarged, but not to the same extent. Beyond this band there is the usual ante-apical row of four spots, the fourth a little out of line, and, not in line with the others, a small triangular spot above the base of the first median nervule. Hind wings without spots. Fringes of fore wings dark brownish gray, cut with black at the ends of the veins; those of the hind wings with the pale part paler; those of the inner margin black; a black line edging both wings, and shading in a little on the hind wings. Underside of fore wings brown, blackish inside the mesial band, grayish along the hind margin, the apex shaded with black and having a few whitish scales. The spots of the mesial are more confluent than above, the others less distinct.

“Hind wings with the base dark, slightly grayish; through the middle an irregular broad black band, not reaching either margin, and having a large patch of brown in it at the end of the cell, the black sprinkled with gray scales. Outside of this to the margin of the wing it is pure white through the middle half; the apical portion, the anal portion and along the margin white more or less tinged with brown; the whole crossed by abbreviated brown streaks. Body black, the underside of head and palpi slightly sprinkled with gray.”

Food plants.—*Desmodium dillenii*; *D. paniculatum*; *Indigo*, *Indigofera*; *Ipomœa pandurata*.

“*Caterpillar.*—Last stage. Head black, uniform, not heavily scabrous, the rugosities having a tendency on the front to form lines converging on the mandibles; the denticles of posterior summit curved forward. Hairs uniform, short, fulvous; all mouth parts black.

“Body dark green with a bluish green, moderately broad dorsal line, the body heavily besprinkled with yellowish orange dots on and surrounding the papillæ, giving it a somewhat rusty appearance; these become more orange in a narrow lateral stripe, but not in the broader and vague infrastigmatal stripe; besides, the body between the brighter dots is frequently pointed in black specks, generally clustered in lines or small spots; on the last three segments the rust color is more marked; the thoracic shield is black brown, smooth, slightly shining, with short, black, non-tapering hairs, the front edge of the segment pale blood red. Hairs of body pellucid; spiracles black with a slender, inconspi-

cuous, testaceous annules surrounded by a pale areola. First pair of legs black, others color of body; the claws fulvo-testaceous. Length of body, 35 mm.; breadth of body, 5.6 mm.; of head, 4.5 mm.; of first segment, 3 mm.

"*Chrysalis*.—Color of anterior parts whitey brown, darkest toward head, of the abdomen sordid yellow brown; all the prominences of the head are marked with minute papillæ clustered into black patches; similar black or blackish fuscous papillæ are scattered irregularly and sparsely over the thorax, sparsely and with considerable regularity over the abdomen, being arranged very largely in transverse lines; each gives rise to a short brown bristle, mixed with some piceous ones; these bristles are stout, equal, truncate; prothoracic spiracles black-brown, shining; cremaster fusco-castaneous. Length, 21 mm.; breadth, 6 mm."

Habitat.—Ill.; Wisc.; Miss. Valley to Gulf of Mexico; Nashville, Tenn., July 16th; Glenside, Pa., May 29th.

Eudamus (Rhabdoides) cellus Bd.-Lec., pl. 73, 1833.*

"Expanse of wings from 1.9 to 2 inches. Upper surface dark blackish brown; fore wings crossed by a broad continuous yellow band, beginning near the middle of the costa and ending in a point near the posterior angle, bending inward a little here towards the hind margin. From costa to the lower branch of the median the band is of nearly uniform width, but the rest of the distance it tapers a little. The inner edge is nearly straight, but the outer sends out an angle just below the end of the cell. Three-fourths of the distance from the base, extending from the costa back, is a short anteapical line composed of three quadrate coalescing yellow spots, and a small dot next the outer lower corner of the third spot. Hind wings without marks, except a little yellowish at the apex. Fringes black or blackish, with a few gray or whitish spots between the veins. Underside of fore wings the same as the upper, except that the hind margin is gray, the apical half of the outer margin reddish brown, and the costal portion of the mesial band and anteapical line paler yellow. Hind wings dark purplish brown, with three irregular, somewhat poorly defined, darker brown bands, and a very slight sprinkling of buff scales. Along the outer margin is a series of deep brown lunules surrounded by scattering pale blue scales. Body black, underside of palpi and head pale ochraceous."

This species is a very well defined one, and may be known at once by the golden band across the fore wings.

Habitat.—West Virginia to the Gulf of Mexico: Texas; Arizona; Mexico; Putta on the Pacific Slope, Colima, Milpos

* Godm.-Salvin, Biol. Cent.-Amer., 2, 331, 1893, t. 80, f. 8.
Festus Hub., Zutr. Ex. Schmelt., figs. 907, 908, 1837.

in Durango, Ceurnavaca, Xucumanatlan, Omilteme, Pinal, Mexico City, Oaxaca; Nashville, Tenn., Aug. 19th (Osborn); Tallahassee, Fla., Apr. 17th (Maynard); Georgia, Apr. 25th (Abbot).

"Caterpillar.—Last stage. Head black, with a large, bright orange spot at the front base of each hemisphere, lying at the bottom of a large, pale lavender spot, which covers more than half of the front. Body green, with a slender, darker green, dorsal line, a broad, pallid, stigmal stripe, above which the sides are obscured with darker green, dorsal thoracic shield narrow, equal, black, the part of the segment in front very pale brownish yellow, like the legs and under surface. Length 36.5 mm. Described from the figure by Boisduval and Le Conte.

"Chrysalis.—Uniform pale yellowish brown, the incisures dusky. Length, 24 mm.; height, 5 mm. From Boisduval and Le Conte." (Scudder.)

Food plant.—*Breweria aquatica*.

From the dates of capture it would appear that there are two broods of this species. "In Montgomery County, Virginia, *cellus* is occasionally taken in the watered rocky ravines where the wild catnip covers the ground" (Smyth).

Eudamus (Rhabdoides) pseudocellus.

Achalarus pseudocellus Coolidge and Clemence, Ent. News, 23, 3, 1911.

"Male.—Upper surface of primaries brownish-black, somewhat lighter along the external margin, and sparsely dusted with whitish atoms, a macular band extending from costa across end of cell and abruptly terminating about 2.5 mm. from lower angle; this band is divided by the nervules into five spots as follows: first, quadrate; second, elongate; third, with the nervules Y-shaped and projecting outwardly; fourth, quadrate; and the fifth, triangular; the formation of this band is similar to that of *cellus*, and is quite regular, the fifth spot, however, varying considerably in size and shape; color of first spot pure yellow; the second orange, slightly tinted with yellow anteriorly; the others all orange; midway between this band and the apex a small procurved whitish-yellow bar; otherwise immaculate. Secondaries concolorous with primaries, immaculate, fringes of primaries at lower angle whitish, becoming black checkered as they approach the apex, where there is usually a distinct whitish patch of fringes. Fringes of secondaries checkered black and gray. Primaries beneath with spots reproduced; color as above but considerably lighter along outer margin and dusted sparsely with grayish scales; inner angle clouded with buff, in some specimens a distinct whitish point below

bar of costa, and in others another similar point immediately outward of end of costal bar; one or both of these may reappear faintly on upper surface. Secondaries beneath brownish; two irregular wavy dark brown bands, heavier than the ground color; between these bands along the outer margins the coloration is pallid; scattered gray scales, heavier at anal angle than elsewhere. Fringes of primaries beneath as above; on secondaries the fringes are brownish, the whitish of above being greatly diminished. Antennæ brown with a white color at base of club; beneath whitish yellow; thorax and abdomen dark brown; palpi yellowish-gray. Expanse 1.30 to 1.50 inch. ♀."

We do not discover any essential differences in the female, either as to size or ornamentation.

Type locality. — Ramsey Cañyon, Huachuca Mountains, Cochise County, Arizona, 5000–7000 feet altitude.

Described from two males and two females in the collections of Coolidge and Clemence, and from 67 cotypes, five of these in the collection of Dr. Barnes."

The authors state that the species was taken from June 7th to July 10th. It was plentiful in early July.

This is likely to prove the spring form of *cellus*, the form from wintering chrysalids.

There is a specimen of *pseudocellus* in the collection of the Academy of Natural Sciences of Philadelphia bearing the label, "Real del Monte, Hidalgo, Mexico, April 13th, 1908."

Eudamus (Nascus) euribates Cram., Pap. Exot., t. 393, f. D, (♀), 1782.

Hesus West.-Hew., Gen. Diur. Lep., pl. 78, f. 5, 1852.

"Expanse $2\frac{1}{4}$ to $2\frac{3}{8}$ inches. Primaries much produced apically. Ground color rich rufous brown, shaded with deep umber on outer and abdominal margins, and approaching black-brown on costal margin of secondaries. Primaries with three subapical honey-yellow spots, the upper very minute; an irregular discal patch of the same color translucent, resembling a three-leaf clover in shape, and composed of three unequal outwardly notched spots, extends from the costal area well towards the posterior angle. This patch is faintly margined by black; at the juncture of the three spots there is a triangular spot of the ground color. On the costal margin a deepening of the scales and a deep incision running therein for about one-third the length of the wing presents the appearance of an aborted costal fold; sometimes this area is a lavender-gray color. On lower margin towards base there are two small black spots and two small less distinct just below the outer angle of the discal patch; these seem to be a disconnected continua-

tion of a band of two or three still fainter on apical area. Secondaries have a small round black spot on disc and a row of five or six of the same color, and a varying size parallel to the outer margin.

"Beneath the ground color is much duller in tone and more clouded. Honey-yellow spots, of the primaries above, reproduced; black points wanting. Secondaries without the broad area of black-brown on costal margin; the spots of the upperside are replaced with spots of a lighter color than the ground encircled with brown fuscous. The row of spots parallel to the outer margin is made to continue in its submarginal course by the addition of two spots placed parallel to the costal margin. Beneath the discal spot and towards the abdominal margin there is another somewhat smaller.

Body and thorax above and below concolorous with the wings; head above the same, below much brighter. Antennæ annulated with black and the general color, brighter at base of tip, then black, and finally ending in a long tapering tip of the general color."

Habitat.—Texas; Mexico; Central America; Brazil.

Eudamus (Epagyreus) tityrus Fabr., Syst. Ent., 532, 1875.

Wings somewhat tailed, brown; the anterior with a yellow band on each side, the posterior snowy beneath. Antennæ black, hooked. Anterior wings uniform brownish, with a short band and another spot, apices yellow; posterior somewhat tailed, spotless above, beneath with a broad, very white band. The brown Carolinian *Papilio* marked with pellucid golden, whitish beneath.

Food plants.—*Amorpha fruticosa*, *Robinia pseudacacia*, *R. viciosa*, *R. hispida*, *R. neomexicana*, *Wistaria frutescens*, *Lespedeza capitata*, *Lathyrus paluster*, *Apios tuberosa*, *Desmodium marylandicum*, *Desmodium nudiflorum*, *Amphicarpaea monoica*, *Desmodium canadense*.

"Last stage of *caterpillar*.—Head dark brownish red, delicately scabrous and clothed with short pile; between the ocelli and the labrum a large, roundish, bright orange spot. Body greenish yellow marked with transverse lines, blotches and dots of grassy green; the lines encircling the body above, the blotches being abundant on the sides and the dots forming a transverse row on the outer anterior edge of each segment. Collar just behind the head, dark brownish red; first thoracic segment orange-red; the shield browner and its hinder edge delicately infuscated; last segment greenish, rimmed posteriorly with yellow; beneath dark green dotted with yellow excepting the first segment which is red. The body is densely covered with exceedingly short, fine hairs. Spiracles velvety black, bordered with pale green; second and third thoracic segments, but especially the former, marked with black in the place where the spiracles would be if there were any.

Legs orange-red, the front pair brighter, the claws infuscated. Pro-legs greenish, all but the anal pair marked externally with transverse bands of pale orange. Length, 37 mm. ; breadth of body, 6.25 mm. ; of head, 5 mm. ; collar, 2.25 mm." (Scudder).

"The *chrysalis* is .76 inch long, the head case blunt conical ; the dorsum from near the head nearly straight ; the ventral side strongly ventricose, tapering abruptly from the end of the ring cases to the tip of the abdomen, the cremaster a somewhat triangular piece, .06 of an inch long. Color reddish-brown, finely mottled and spotted with dark brown, the end of the humerus blackish-brown, with two smaller spots between them. Stigmata and eyes darker than the general color" (French).

Habitat.—Br. Am. ; Ont. ; Queb. ; United States generally ; Mexico ; Antilles ; Sth. Am. ; Nashville, Tenn., July 7th to July 27th ; Miami, Fla., January.

Eudamus (Epargyreus) zestos Hub., Zutr. Ex. Schmett., figs. 615, 616, 1832.

Oberon Worth., Papilio, 1, 132, 1881.

Tityrus var. *zestos*, Aaron, Papilio, 4, 26, 1884.

"Expanse of wings from 2.2 to 2.4 inches. Upper surface dark brown, with a slight bronze reflection, marked almost like the upper surface of *E. tityrus*. There is a yellow band from near the middle of the costa back towards the posterior angle, ending in a blunt point about the middle of the medio-submedian interspace, the point below the lower median fork being about twice as large as in *E. tityrus*. The inner edge of the band above the median fork is nearly straight, being notched a little at the subcostal vein, but is a little more oblique than in *E. tityrus*. The outer edge is more irregular, the spot in the cell and the one in the lower median interspace being concave, and there are notches at the median and subcostal veins. The spot outside the band in the first median interspace is nearly square. Beyond the band is the usual anteapical line of three spots, extending obliquely outward in a curve. Underside of about the same general color as the upper, the fore wings with the marking of the upper surface. The hind wings have a faintly indicated median band of a slightly paler color than the rest of the wing, not reaching either margin, and two faint spots between this and the anal angle, and more or less scattering tawny scales. Both wings below have a strong purplish reflection, the outer margin slightly paler. Fringes concolorous with the wings, the hind wings paler, but without brown at the ends of the veins. Body above purple brown ; thorax covered with tawny hairs, beneath more or less shaded fulvous ; palpi fulvous. Club of antennæ brown above, fulvous below and at sides. This species strongly resembles *tityrus* above, but the yellow spots are less confluent and more

opaque, the general color is deeper, and the fringes are not divided by brown at the ends of the veins. The underside lacks the conspicuous silvery white band on underside of the hind wings."

This species flies with *tityrus* in South Florida, and seems to be distinct and invariable.

Habitat.—Sanford, Marco Island, Key West, Miami, Fla.

Eudamus (Epargyreus) exadeus Cram.

Cram., Pap. Exot., t. 260, f. C, 1782.

"The upper surface of the wings does not differ from Fig. A, but below the pattern varies from it [fig. A] and chiefly that of the inferior wings. All the white spots and points of these wings have a silver lustre, but the yellowish spots of the superior wings are transparent. It belongs to the family of noble plebians, comes from Surinam, and is in the cabinet of Mr. W. van der Meulen."

Habitat.—California; Mexico; Cent. Am.; South Amer.; Trinidad.

This species is placed in our fauna from a specimen from San Luis Obispo, Calif. Taken in fresh condition in March.

Eudamus (Proteides) idas Cram.

Cram., Pap. Exot., 3 pl., 260, f. A B, 1782.

"The hair obscure yellowish, that which the body and a part of the upper surface of the wings are covered has a sickly lustre. The yellow spots of the superior wings transparent. It belongs to the noble plebians (Pap. Pleb. Urbicol.) and lives at Surinam."

Habitat.—Arizona; Texas; New Mexico; Mexico; Central and South America; Haiti.

Eudamus (Goniurus) proteus Linn., Syst. Nat., 1, 2, 794, 1767;
Godm.-Salvin, Biol. Central-America, p. 277, pl. 75, f. 58
(gent.).

"Wings tailed, brown; spots latticed; antennæ hooked. Lives in grass of America."

"Upper surface dark olive-brown; base of fore wings, basal half of hind wings, and upper part of body with light green hairs. The fore wings have an oblique transverse row of four whitish hyaline spots extending from the costa near the middle to near the posterior angle. Beyond this row is a spot in the first median interspace, constricted in the middle; and beyond the cell is an anteapical row of five spots, curved, the first two spots oblong, the third nearly quadrate, the fourth and fifth elongate in the direction of the line, the fourth often divided in the middle into two spots. Hind wings without spots, the anal angle produced into a tail; outer margin dentate. Fringes of fore

wings gray, but with brown at the ends of the veins; of hind wings white, except those of the tail on the inner margin, which are black. Underside of fore wings brown, the costa at base, the area between the two bands, and the outer margin purplish fuscous. The spots are enlarged, and are more confluent than above. The hind wings have the same glaucous color all over their surface excepting the tail, the anal two-thirds of the outer margin, and the two bands through the wings, which are olive-brown, the tail almost black. The inner of these two bands reaches only to the subcostal vein, and above that and a little to each side are two black patches. The whole surface is sprinkled over with a few whitish and yellow scales. Palpi pale gray, underneath almost white."

Habitat.—Connecticut; New York to Gulf of Mexico; Central America to Argentina; Antilles. Mexico: Mazatlan, Venta de Zopilote, Cuesta de Misantla, Orizaba. Guatemala? Chisoy and Polochic Valleys, San Geronimo, Dueñas, Zapote. Honduras: San Pedro. Costa Rica: Irazu, Caché. Indian River, Fla.; end of March (Palmer) Georgia, last of July (Abbot). Three broods in Florida (Palmer).

"The first brood comes out early in the Spring (in Florida) and a succession of generations continue until stopped by cool weather" (Quaintance).

"*Caterpillar*.—Last stage. Head of liver color, on each side of the ocelli a red spot; mandibles black. Collar black, the first ring below and on the sides of minium color. The general color of the body is glaucous with little green spots and with black points on the superior part of the stigmata which are dark orange-red. The dorsal line is black, on the superior sides of the body is an orange longitudinal band, becoming red behind, where the two are joined over the anal plate. The horny legs are dark brown externally, the fleshy legs are orange colored. Gundlach" (Scudder).

"*Chrysalis*.—Dark brown according to Wittfeld; when dried, fuscoluteous beneath, above mahogany colored, more or less tinged with luteo-olivaceous, shining throughout; hairs of the head as well as the scant hairs of the rest of the body luteous; the bristles of the prothoracic spiracles luteo-fuliginous; the posterior lip of the spiracle itself piceous; mesothorax faintly striate in irregular, transverse, wavy, somewhat tortuous, distant lines. Abdominal segments sparsely irregularly, and rather finely punctuate, the punctures fuscous. Cremaster dark fusco-castaneous. Length, 22.5 mm.; width of head, 5.25 mm.; of mesothorax, 6.5 mm.; of abdomen, 7.5 mm.; length of cremaster, 2.25 mm." (Scudder).

"*Caterpillar*.—Last stage. Length about 3 cm. (1.17 in.); width of head, 4.5 mm.; width across third segment, 5 mm. (.195 in.). Slope of body somewhat fusiform, thickest about the middle, and tapering slightly at each end. Head somewhat cordate in shape, quite large. Color yellowish, sprinkled with black; lighter below, without black markings. The lateral yellow lines of the preceding stages more orange colored. Narrow dorsal line present. Two broken rings of orange on prolegs. Head with the usual orange spots near the base of mandibles; the apical third of head rufous, the rest black. Prothoracic shield black, ventral portion of this segment dark red. Thoracic legs black; head greatly constricted behind, forming a narrow neck. Body and head covered with numerous short, light colored hairs.

"*Chrysalis*.—Length about 2.25 cm. (.877 in.); width about 6 mm. (.234 in.). At first greenish-yellow in color, particularly the wings and thorax; at length, shining brown in color; eyes brownish-black. In the course of two or three days the pupa becomes covered with a flocculent excretion. The cremaster consists of numerous brown hairs with curved tips, forming hooks" (Quaintance).

The caterpillar feeds on *Wistaria frutescens*, *Desmodium viridiflorum*, *Phaseolus perennis*, *Clitoria mariana*, *Clitoria ternatea*. In the South also feeds on Cruciferæ—beans, turnips, cabbage.

Eudamus (Thymele) simplicius Stoll, Suppl. Cram., pl. 39, figs. 6, 6 E, 1791; Godm.-Salv., Biol. Rhoph., 270, Tab. 75, f. 1 ♂.

Expands $1\frac{1}{8}$ inch. Upperside brown; immaculate in some specimens; tails to the hind wings $\frac{9}{16}$ inch in length. In other specimens on the primaries there is a line of spots extending from the costa across the wing toward the inner angle and ending at the third median nerve. This line is formed of, first two small spots on costa, a long one at end of cell; then a triangular small one, then another long one, and lastly a point just beyond third median nerve; there are sometimes three and sometimes four subapical spots. Underside.—Primaries show the spot above when they are present. Secondaries have two parallel, dark brown bands extending across the wing from the costa to the inner margin.

This species comes near to *E. eurycles* Latr., and Godman and Salvin, in the *Biologia*, say: "The male in *simplicius* has a costal fold to the primaries, and this is a character separating it at once from *eurycles* whatever the definition of the transverse band of the former may be. Females of the two species can usually be distinguished by the outer margin

of the secondaries in *simplicius* being more rounded and forming an angle rather than a curve where the tail commences."

Habitat.—Texas; Arizona; Mexico; Central America; South America to Paraguay.

Eudamus (Goniurus) eurycles Latr., Enc. Meth., p. 730, 1823.

Primaries dark brown, with four subapical costal spots; a narrow transverse diaphanous fascia extends across the wing from the costa to near the angle, broken into seven spots or sections by the nervures. Secondaries immaculate. Primaries on underside are the same as above. Secondaries beneath with a basal fuscous quadrate spot, a central broken fascia and an unbroken larger fascia, submarginal. The secondaries are tailed. No costal fold in the male. The diaphanous markings of primaries may be absent.

Habitat.—Texas; Arizona; Mexico; Central and South America.

We do not appear to have any authentic records for this species in the United States. It has probably been confused with *simplicius*.

Eudamus (Goniurus) albofasciatus Hew.

"Description of One Hundred New Species of Hesperidæ." By W. C. Hewitson. Part I. London, 1867.

Biologia, p. 280, pl. 75, fig. 11, Gent.

Upperside dark brown. Anterior wing with eight transparent spots; four forming a central band (the lowest spot very minute), one outside of these and three in a band before the apex. Posterior wing with a very long tail. Underside.—Anterior wing as above, except that it is gray near the apex and marked by a triangular dark brown spot. Posterior wing dark brown, crossed obliquely by a central band of white; a submarginal band of gray. Expansion 2 inches.

Habitat.—Guatemala (Poloehic Valley); Texas; Arizona; Mexico; Nicaragua; Costa Rica.

Food plant unknown.

The long tails and broad white band of the species are very conspicuous.

Huachuca Mts., Arizona, August, Carr Cañon (Skinner).

Eudamus (Goniurus) dorantes Stoll, Suppl. Cram., Pap. Ex., p. 172, t. 39, f. 9.

Protillus Herr.-Sch., Prodr., p. 36.

Amisus Hew., Derc. Hesp., p. 5; Ex. Butt. Eud., 2, f. 10.

"Expands $1\frac{1}{8}$ inch. Color dark brown with tails to the hind wings

$\frac{7}{16}$ inch in length. Primaries are marked with nine translucent spots; three subapical; one at end of cell and a minute one above it on costa; four in the disc divided as follows: one minute point, and below it and toward base a larger hour-glass shaped spot; next below and still nearer base a rectangular spot; below this and toward exterior margin a small nearly quadrate spot. Inferiors immaculate but edges crenate, with dark extending into the lighter fringes. Underside.—On primaries the spots are all repeated. Secondaries have two parallel more or less broken bands extending from costa to near inner margin.

Var. **rauterbergi** Skinner, Ent. News, 6, 113, 1895.

♂. Expands one and three-fourths inch. Upperside.—Dark smoky-brown in color; superiors have the nine hyaline spots, a faint one on middle of costa, and three extending in a line between this and the inner angle; one in middle of disc and a faint one in the interspace above; these are close together below the costa on the outer third of wing. Inferiors immaculate, with tails a half inch in length. Fringes alternating black and cinereous. Underside.—Superiors as above. Inferiors grayish with black longitudinal bands. This form is smaller and very much darker than *protillus*; the fringes are far less marked, and the tails lack the admixture of light hairs; the maculation is about the same as in the species.

Habitat.—Texas and Arizona; Mexico; Central America; South America.

One specimen from Mr. F. Rauterberg, who received it from Comal County, Texas. I have also seen a specimen belonging to Dr. Wm. Barnes taken in Arizona.

Records.—Carr Cañyon, Huachuca Mts., Arizona, October 19th (C. R. Biederman).

Erycides (Phocides) urania West.-Hew., Gen. Diur. Lep., 510, pl. 79, fig. 1, 1852.

Erycides texana Scudder, Rep. Peab. Ac. Sc., 4, 67, 1872.

Phocides urania Godmn.-Salvin, Biol. Cent.-Amer., Tab. 76, f. 22 ♂ gent. Aaron, Ent. News, 1, 23, 1890; Skinner, Ent. News, 2, 101, 1891, pl.

“Expanse 2 to $2\frac{3}{8}$ inches. Ground color above black on both wings; banded and spotted with bright green on blue. On the primaries this banding in most examples is caused by the fact that nearly the whole surface is covered with a dense coat of scales of bright green, which being separated by the black bordered nervures, take on the form of longitudinal bands: in a few specimens, however, the apical area is but slightly sprinkled with green, and the whole outer half of the wing appears black or nearly so. A group of translucent subapical spots consists of three constricted points along the costal margin, one larger

below the outer of the three, and a much larger quadrate spot centrally below the fourth. Two translucent bands follow these spots internally, the first bifid, short, hardly more than an elongated spot, the inner one crossing the median area much longer and made trifid by two nervures. The color of the markings on the secondaries is much brighter; and towards the anal angle of a deep azure-blue tint in some examples. From the base three streaks diverge towards and stop abruptly on the median area, the upper of these is shorter than the others to make room for the bifurcate series of spots on the outer area of the wing. These spots, four in the inner line and seven in the outer, are placed in the form of a written letter Y. On some examples there is a faint indication of another streak, longer than the three others running parallel to the abdominal margin. Beneath, color and markings a reproduction of the upper surface, save that while the black is not so dense on the primaries, it is deeper and more velvety on the secondaries. The green atoms on the primaries are fewer; on the secondaries they are brighter, and the bands run all the way to the costal edge. Thorax above black, with tufts of green hairs and annulations of the same color. Head and palpi above green spotted, with white. Antennæ black, dark cinereous at tip. Emarginations, above and below, notched, white."

Habitat.—Texas; Mexico; Central America.

Erycides (Phocides) lilea Reak.

Erycides lilea Reakirt, Proc. Acad. Nat. Sci., Phila., 18, 339, 1866;
Biol. Cent.-Am., 2, 296, t. 76, f. 23, 24, 1893.

Erycides sanguinea Scudder, Syst. Rev. Am. But., 47, 1872.

"Upper surface shining blue-black, irrorated with lustrous green particles over the basal area and the body; a large fulvous red costal spot on the primaries cut by the subcostal vein; outer margin of both wings, including the anal angle of secondaries, fringed with white hairs, especially long upon the latter. Underneath as above, but destitute of the green irrorations. Expanse 2.25 inches. Body blue-black, the palpi, excepting the terminal joint and a collar, fulvous-red; antennæ black. Var *a.*; the abdominal margin is fringed with dark brown hairs. encroaching slightly upon the white anal ailiæ."

Habitat.—Mexico, near Vera Cruz, W. H. Edwards. A local race of the well-known *Erycides palæmon*. Texas (Captain Pope, Mexican Boundary Survey); Mexico; Guatemala; Costa Rica.

Eudamus (Phocides) (Erycides) batabano Lucas; Sagra,
Hist. Cuba, 7, 624, 1856.

"E. alis læviter subprolongatis utrinque fuscis, anticis ad basin nitido-caeruleis, posticis duabus lineis transversalibus versus basin

eujusdem coloris; abdomine nitedo—cærus annulato. Envergure (femelle 61 mm.).”

“*Male*.—Expands 2.3 inches. Upperside deep smoky brown, with a pronounced indigo-violet reflection. Primaries without markings, other than a few scattering, blue or green scales about base of wings. Fringes concolorous. Secondaries with a row of brilliant blue or green elongated submarginal spots, more or less confluent, interrupted by the veins, and becoming obsolete toward anterior margin, fringes with some white in intervenular spaces. Beneath, primaries paler and with a purplish cast, a few blue or green scales along costa, about base and near inner angle of wing. Secondaries much like upperside, but deeper. The purplish reflection at anterior margin gradually changing to a deep indigo as it approaches the abdominal fold; a few blue or green scales in median space and along abdominal margin, submarginal spots as above but brighter. The female expands 2.6 inches. Upperside paler than male, gradually growing deeper over both wings until nearly black at anal angle; all wings with a faint purplish reflection in certain lights. Markings on secondaries like those of the male. Beneath differing from the male only in the paler color and in having a purple reflection, which is more pronounced on upper surface. Body deep brown above and below, some blue or green lines on collar, front and shoulders, and arranged in bands on posterior segments of abdomen. Palpi greenish white. Antennæ dark brown.”

Dyar, Can. Ent., 22, 211, 1890 (Life History).

Habitat.—Florida; Cuba.

Records.—Miami, Florida.

Eudamus (Acolastus) (Erycides) amyntas Fab.

Erycides amyntas Fabricus, Syst. Ent., p. 533, 1775.

E. savignyi Latreille, Enc. Meth., 9, 741, 1823.

“*Alis subcaudatis, fuscis, fenestrati maculatis; posticis subtus puncto baseos atro. Antennæ uncinatæ, apice subferruginæ. Alæ posticae supra immaculatae, subtus glaucae, fasciistibus obscurioribus et puncto distincto atro ad basin. Habitat in America.*”

“Expanse of wings 2 inches. Upper surface dark brown, almost black, with a strong purple reflection. A little beyond the middle of cell of fore wings is a white hyaline bar extending across the cell, emarginate externally. Below this and a little further out, in the second median interspace, is a similar but larger subquadrangular spot, and in the first median interspace is another, more oblong in shape. The first two of these three spots represent two of the four spots which form the median oblique band of *Eudamus tityrus* and allied species. Near the apex there is an oblique row of these anteapical small spots, subquadrate in form, the first the smallest. Hind wings without spots. Fringes fuscous, those of the fore wings darkest; the anal angle some-

what produced. the underside has the spots of the upper surface of fore wings repeated. The surface along the costa, a broad apical portion and external margin of fore wings, and all of the hind wings, except two bands of spots and the anal angle, rich purple, not very dark; all the rest of the surface dark brown. The dark brown portion consists of two transverse bands, marking nearly the division of the wings into thirds, and a basal portion of the anal angle. Body black; palpi and underside of head gray."

Habitat.—Florida; Arizona; Mexico; Central America; Antilles.

Records.—Key West, Fla., January; Miami, Fla., January; Phoenix, Florence, Arizona, September 3rd (C. R. Biederman); Dyar, Ent. News, 8, 182, 1897 (Life History).

***Eudamus (Erycides) (Pyrrhopyge) araxes* Hew.**

Erycides araxes Hewitson, Descrip. 100 New Species of Hesp., Part 1, page 2, No. 3.

"Upperside dark brown, the fringe snow-white, intersected with dark brown. Anterior wing with ten transparent white spots; three forming a central transverse band, three outside of these forming a short oblique band, three before the apex, and the tenth a minute spot at the costal margin. Underside dark brown. Anterior wing as above, except that it is rufous at the base. Posterior wing with the base and inner margin and two transverse bands orange-yellow. The first band before the middle, regular and trifid; the outer band beyond the middle curved outwards, undulated and composed of several spots. Expanse 2 inches. Habitat Mexico. In the collection of W. C. Hewitson. Like species of *Eudamus* in general appearance, but with the antennæ of this genus."

The Biologia says: "Hewitson's description of the species was based on a Mexican specimen now in the collection of the British Museum. Our Mexican series of examples agrees generally with the type, though there is a considerable amount of variation as regards the definition of the markings of the secondaries. In Arizona specimens these marks are evanescent, and the dark outer border is not clearly defined on its inner edge. The difference is sufficient to constitute a distinct race. Plotz also recognized two forms, but unfortunately gave a new name *cyrillus* to the true *araxes*, the Arizona form being his *araxes*. To rectify this we propose to call the northern insect *Pyrrhopyge*

arizonæ, specimens of both sexes being in our collection sent us by Morrison from the neighborhood of Fort Grant."

Habitat.—Arizona.

Records.—Carr Cañon, Huachuca Mts. Arizona, September 29th and August 15th (Skinner).

Godman and Salvin in the *Biologia Centrali-Americana* propose the name *Pyrrhopyge arizonæ* for the Arizona form based on specimens sent by Morrison, the markings on the underside of secondaries being evanescent. This is true of all the specimens from Arizona that I have examined, none of them showing the distinctive markings of the figure in the *Biologia* of *araxes* (Pl. 73, f. 15).

MEGATHYMUS Scud., Rep. Peab. Acad. Sci., iv, 83, 1872.

Megathymus yuccæ Bd.-Lec., pl. 70, 1833.*

"Expense of wings from 2.5 to 3 inches. *Male*.—Upper surface deep umber-brown, the base of both wings tinged with yellow, the markings yellow. The fore wings have a large spot in the outer end of the cell that is subquadrate; above this in the interspaces are three small spots in an oblique line, but little more than mere dots. Beyond these is a submarginal row of spots which begin in the usual line of anteapical spots about four-fifths of the distance from the base to the apex, but the two spots opposite the cell are nearer the outer margin, and from these they gradually run till the last one is close to the posterior angle. The first of the four anteapical spots is a mere dot, the next three are a little longer than wide, the fifth and sixth are narrow but reaching from vein to vein, the seventh and eighth are in the median interspaces, and the ninth is above the submedian. The last three are somewhat irregularly convex on the inner side, but less so on the outer. Hind wings without spots, but with a yellow washing along the outer margin. Underside deep brown, like the upper, but brighter, the outer portion of both wings pearly gray, with a patch of the same color on the middle of the costa of the hind wings, and a white crescent below it, and the same scales sprinkled along the inner margin and the faint streaks through the wings. The spots of forewings are repeated, but somewhat enlarged, the color paler yellow, whitish in the costal region. *Female*.—The general color and markings of the fore wings as in the male, but much larger. The spot in the cell extends from vein to vein, and inward along the median a little way toward the base, the three spots above nearly as long as the spot in the cell is

* Riley, Tr. Ac. Sci. St. Louis, 323-344, 1876; id., 8th Mo. Ent. Rep., 169, 1876; id., 9th Mo. Ent. Rep., 129, 1877.

wide. Besides the much enlarged anteapical spots, which are paler yellow than the other spots, there are three oblique pale yellow spots on the costa before the apex. The lower three spots of the submarginal band are widened, so that the inner upper corner almost reaches the cell. Hind wings, besides the yellow scales along the margin, have a discal row of four small spots reaching either margin. Underside as in the male, except that the spots are prominent, and the spots near the costa of the fore wings are more washed with white."

Habitat.—From South Carolina to the Gulf of Mexico.

Var. **coloradensis** Riley, Tr. Acad. Sci. St. Louis, 3, 566, 568, 1877.

"This Colorado form is remarkable for its small size and the paleness of its colors compared with those reared farther South on the larger leaved, more luxuriant *Yuccas*. It is also distinguished by a second narrow white line on the underside of secondaries just outside the larger triangular white spot from costal vein; also by the dark spots on this underside of secondaries, generally having a white pupil, a tendency thereto being noticeable in the Carolina specimens."

Habitat.—Colorado. Larva feeds on ? *Yucca angustifolia*.

Larva feeds on *Yucca aloifolia*, *gloriosa* and *filamentosa*, burrowing in the stems and roots.

Megathymus cofaqui Strecker, Proc. Acad. Nat. Sci., Phila., 28, 148, 1876; Streck., Lep. Rhop. Het., pl. 15, f. 2.

"*Female*.—Expands two and one-sixth inches. Head dark brown; palpi whitish; thorax brown, mixed with hoary, posterior half, above clothed with yellowish hair; abdomen brown; antennæ black above, white beneath, terminations black. Upper surface of wings blackish brown. Primaries with an exceeding irregular, bright, deep yellow band extending from vein one to the subcostal nervure; the outer edge of this band is rather regular from veins one to four, though further removed from the extreme margin at the latter than at the former; from veins one to two it is narrow, from veins two to four it is nearly three times as broad, extending to where vein three joins the median vein, the balance of it is within the discoidal cell and is narrow, of about the same width as it is between veins one and two; the portion of this nearest the costa is paler in color than the rest. Between veins four and six, exterior to this band is a mark composed of two small almost connected yellow spots. Interior to these, between veins six and nine, is a narrow yellowish-white mark. Midway between the inner edge of the large yellow band and the base of wing, and between

veins one and two, nearest the latter, is a roundish yellow spot. Inner half of base covered with rich yellow hair. Fringe yellowish-white, alternated with dark brown at terminations of veins. Secondaries.—Basal third, especially in inner part, heavily clothed with rich yellow hair and scales, a band of four yellowish spots, separated only by the veins, cross the wing beyond the middle; from this band toward the costa, opposite the apex, is another quite yellow spot, which is succeeded by a larger one near the costa, nearly midway between the apex and base of wing. Outer margin between the veins yellow, forming patches more or less triangular, with the points inwards. Fringe yellowish-white. Under surface.—Primaries brown, not so dark as above, and shaded at outer margin and apex with hoary; no yellow at base of wings. Markings as above, excepting that the yellow band is continued from its lower end to, and connected with the yellow spot between it and the base, and between veins one and two. Secondaries.—Hoary or whitish-gray. dark brown along costa, especially towards the base. Towards anal angle a fine white spot, corresponding in position with the first of the series of four that compose the yellow band of upperside; each of the remaining yellow spots of upper surface and the next one of the two, between them and the costa, is represented by a small dark brown spot, or rather row of continuous spots; the last towards the costa is replaced by one of pure white; half way between this latter spot and the base is another white spot, and also one in the discoidal cell, from which a dark brown line extends to near the abdominal margin. Fringes white and brown. Locality Georgia. One specimen."

Habitat.—Georgia; Florida.

Records.—St. Augustine, Florida (C. W. Johnson); Tifton, Georgia, September 11th (G. R. Pilate).

Megathymus streckeri Skinner, Can. Ent., 27, 179, 1895.

Cofaqui ♂ Strecker, Br. Bull., 3, 66, 1880.

"*Male*.—Expands from two and three-quarters inch to three inches. Upperside.—Superiors rich brown, but not as bright, nor has the brown as much red in it as *yuccæ*. There are three subapical white spots; a lemon-yellow spot at end of cell; there is a row of five yellow spots running across the wing, parallel with the exterior margin; the upper two are small and square in shape; the lower three are small and triangular, and there is one in each of the three median interspaces. The inferiors have a yellow marginal border about one-eighth of an inch in width, the wing being otherwise immaculate, and is clothed with long silky brown hair. Underside.—Superiors have the spots repeated. Inferiors are gray, with a varying number of small white spots—one specimen having two and the other five. The female is larger and has the same number of spots as the male; the three

subapical spots white and the remainder yellow; in the female the five spots on the wing are in two series, the two upper being nearer the exterior margin, and the three lower are nearer the base; in other words, they do not form a continuous line as in the male. This species has been confounded in collections with *cofaqui* Strecker, which was described from a female. The male of *cofaqui* is marked practically like the female, but the male has the long hair on the inferiors as in *streckeri*. This long hair is also conspicuous in *streckeri* at the base of the superiors below. This fine species is described from two males in my own collection; one is from Texas and the other probably from Arizona, the exact locality not being known in either case, and a pair in the collection of Dr. Herman Strecker of Reading, Pa. One of these is from Texas and was collected by the late Jacob Boll and the other from the San Juan reconnaissance, made under the charge of Lieut. Ruffner, Colorado, in 1877."

Habitat.—Arizona; Texas; Colorado.

Records.—Durango, Colorado, May 30th (Oslar), June 7th (Oslar); Texas, April 4th, 1884; Highrolls, New Mexico, June 12th (H. L. Viereck).

Megathymus ursus Poling, Ent. News, 13, 4, 1902, pl. 4.

"♀. Expanse $3\frac{1}{2}$ inches. Primaries above brown with three subcostal yellowish-white spots and a band of five large orange spots extending from these to near the internal margin; a spot of the same color near the end of the cell. On the primaries beneath these markings are repeated. Secondaries above immaculate, fringes white. Beneath, there are two white spots on the costa and four small white spots in a line below the central area of the wing."

Habitat.—Pima County, Arizona. The author of the species expresses the opinion that this is the female of *neumoe-geni*. I have not seen the species. It may be readily known from the excellent colored figure in *Entomological News*. It looks to me like a large female of *streckeri*.

Megathymus smithii Druce, Biol. Cent.-Am. Het., 2, 320, 1896, pl. 69, f 5 ♂.

"*Male*.—Primaries and secondaries dark brown; the primaries with a small spot at the end of the cell, three spots beyond it on the costal margin near the apex, and a submarginal row of small spots extending almost to the anal angle, the cell pale yellow, fringe alternately pale yellow and brown; secondaries with a submarginal row of rather indistinct yellow spots extending from near the apex to the anal angle, the fringe white; the underside of the primaries brown, with the spots as above, but larger and whiter, that of the secondaries

brown, broadly bordered with gray from the base to the anal angle, and with two zigzag white lines crossing from the costal to the inner margin; head, thorax and abdomen dark brown, the underside of the palpi and part of that of the thorax white; antennæ brown above, white beneath, the tip black. Expanse $2\frac{1}{2}$ inches."

Habitat.—Texas (auct. Dr. Wm. Barnes); Amula in Guerrero, Mexico, 6000 feet (H. H. Smith).

Megathymus neumoegeni Edwards, *Papilio*, 2, 27, 1882.

"*Male*.—Expands two inches. Upperside black and orange-fulvous; costal margin brown; along the hind margin of both wings a broad black band, erose within and opposite cell on primaries incised; on costal margin, beyond cell, a black patch which extends to median nervure, and there connects with a large patch which occupies most of the disk; between this and the border a broad orange-fulvous band from margin to margin, but restricted opposite cell; on costa a fulvous patch anterior to the black one; the basal area darker fulvous. Secondaries have the disk black, much concealed by long fulvous hairs, and between this and the border a light band as on primaries; fringes alternately fuscous and sordid white, white prevailing on posterior half of secondaries. Underside of primaries dark brown at base and on posterior half of wing quite to hind margin, the apex densely sprinkled with gray-white scales; orange repeated, but above median replaced by white; the patch on costa repeated. Secondaries brown, wholly sprinkled with gray-white scales, most densely beyond disk, and this area is somewhat clouded. A small white spot near base below subcostal, otherwise immaculate. Body brown; beneath thorax gray-white, shading toward abdomen into gray-brown; legs reddish-brown, with many gray scales and hairs; palpi white; antennæ brown above, whitish below, tip dark ferruginous.

Female.—Expands 2.2 inches. Legs black, more orange fulvous; the borders as in the male; in one example the black patches are nearly as in the male, but in the other they are greatly reduced. In this last one, on underside of primaries, the orange band is broad and bifid, embracing the costal patch; secondaries in addition to the white spot near base, have a white patch, a cluster of white scales, denser than elsewhere, near the inner angle. From one male and two females taken in Southern Arizona. Another female was taken making four examples. They are described as sitting in the sunlight on leaves of agave and flying when disturbed to adjoining cliffs of rocks, alighting generally out of reach of the net."

Habitat.—S. Arizona; N. Sonora. Mexico.

"About ten miles from Prescott, Arizona, Mr. Jacob Doll noticed a rocky cliff rising sheer from the roadside, and high

up on its side some butterflies dancing about. He climbed slowly up, about thirty feet, and captured a specimen in his net, only to find its wings utterly despoiled when he took it from his net upon descending. On the following day he revisited the spot, having arranged a heavy pad of cloth about the neck of a killing bottle so that it would not be broken when suddenly pressed against the rock. Slowly he climbed up the sides of the cliff, and after two hours hard work had 'bottled' seven specimens of this beautiful species, which were sitting on the bare rocks, but, oh, so shy!' (R. Ottolengui in Ent. News, 6, 218, 1895).

Var. **aryxna** Dyar, Jour. N. Y. Ent. Soc., 13, 141, 1905; Biol. Cent.-Am. Lep. Het., 3, pl. 69, figs. 3, 4.

Dr. Dyar says, "It differs from *neumoegeni* in having the fulvous markings considerably reduced, the outer band being broken into spots. I have ten specimens from Arizona from Dr. Barnes and Mr. Riley." Dr. Dyar says his *aryxna* is figured in the Biologia, plate 79, figs. 3 and 4. Figure 4 I take to be *neumoegeni* ♂, and figure 3 is a species not known to me. Figure 4 is the species or form commonly found in the Huachuca Mts., Arizona. For figure 3 I propose the name *drucei*. *Neumoegeni* is quite variable, the fulvous markings being broad bands or reduced almost to spots.

Megathymus polingi Skinner, Ent. News, 16, 232, 1905.

♂. Head above gray, below white; antennæ black, with a few white scales at the joints and white at the base of the club; body above orange-fulvous, gray beneath. Primaries.—Black and orange-fulvous, with a black border to the exterior margin evident at the apex; on the orange-fulvous inside of this border is a black spot of irregular shape; in the centre of the wing is another black spot irregularly round in shape; the base of the wing is orange-fulvous. Secondaries.—Border black; there is an orange-fulvous band which starts below the costa and extends nearly to the interior margin; the base is orange-fulvous. Underside.—Primaries: These are much as above, except that the upper part of the orange-fulvous band is white. Secondaries.—Gray, with an irregular whitish band parallel to the costa and exterior margin; it begins as a spot and then narrows into a line and then gradually widens in an irregular way; in the centre of the wing are two whitish spots, the lower one much the longer of the two. Ex-

panse 44 mm. The female is a trifle larger, but the markings are the same. This species is allied to *neumoegeni* Edw., but is smaller and may be differentiated at once by the white band on secondaries below.

Described from one male and one female, sent by Mr. O. C. Poling. They were part of a series taken in the Baboquivari Mountains, Pima County, Ariz., October 15th to 30th.

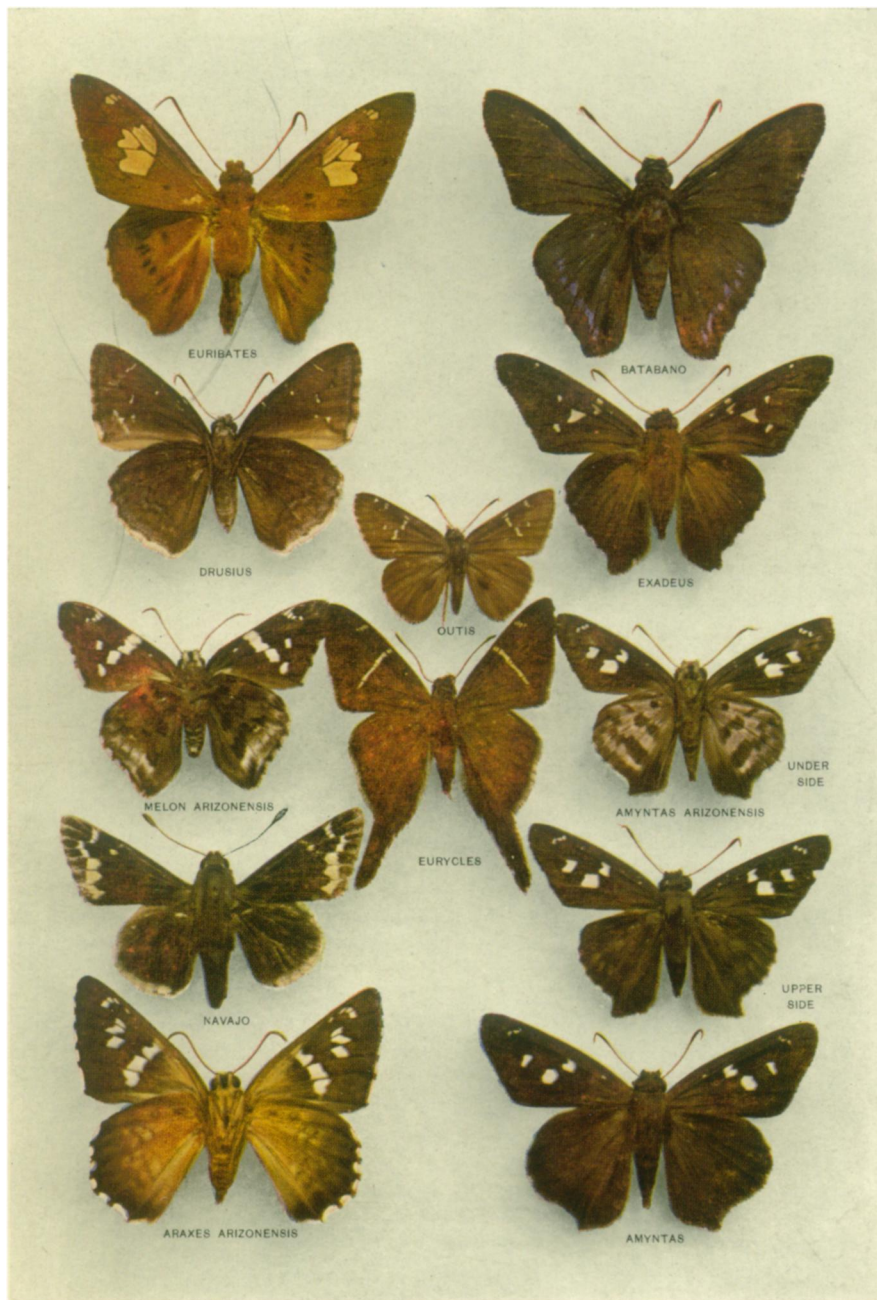
Grais stigmaticus Mabille, Bull. Soc. Ent. Belg., p. 54, 1883; Biol. Cent.-Am., 2. 381, 1894, pl. 84, figs. 24, 25, 26.

"Olivaceous-fuscous; on the anterior wings a blackish antemarginal line, or rather a small streak, sinuate and formed out of separate spots. In the cell two fuscous spots. External margin of the wings sinuate. The posterior wings present three obscure interrupted lines. The fusco-ochraceous lower surface presents the same lines distinctly formed out of black points. Body fuscous. Pectus hairy white, feet and palpi ochraceous. Brazil. This species is of a clear olive-brown, and the dark lines which traverse the fore wings lengthwise are but little marked and almost absorbed on the ground color. The palpi are of an ochraceous yellow, and this color is continued to the breast."

Habitat.—Kerrville, Texas; Mexico; Central America; South America; Jamaica; Victoria, Tamaulipas, Mexico, July.

ADDENDA.

Eudamus electra Lintner, turns out to be an exotic species. It was described about thirty years ago and has been a puzzle to everyone. While on a recent visit to the Carnegie Museum in Pittsburgh I saw the unique type of *electra* and at once recognized it as not belonging to our Boreal fauna and also that it was not an aberration of any of our known species. On looking over some of the other material in the Museum I noticed a female Hesperid from the Godman collection bearing the name *Ephyriades zephodes* Hubner. I saw at once that *electra* was evidently the male *zephodes*. We have two specimens of the species in the collection of the Academy bearing the name *Nisoniades zephodes*. One specimen does not have any locality label and the other was taken at Samana Bay, San Domingo, June 17, 1883, by Dr. W. L. Abbott.



SKINNER ON HESPERIDAE.

ALL FIGURES FIVE-SIXTHS NATURAL SIZE.

THERE SHOULD NOT BE ANY TINGE OF RED ON THE FIGURE OF BATABANO. THE HIND WINGS ARE BLUE-BLACK WITH A BAND OF BLUE SPOTS PARALLEL TO THE OUTER MARGIN.

Mabille in the *Genera Insectorum* places *zephodes* Hubn. and *clericus* Fabr. as synonyms of *otreus* Cramer. In this he may be correct but the figure of *otreus* (Cramer, Pap. Exot., fig. 328) is very crude, and the figure of *zephodes* (Hubn. Samml. Exot. Schmett.) is excellent. It is not certain that they are identical. America meridian is given as the habitat by Mabille.

The specimen of *electra* is a very fresh one and probably came from a chrysalis near where it was found. How the species got to Canada we can only conjecture, the most likely way being on fruit (bananas) as larva or chrysalis.

To the names in *Megathymus* should be added *M. yuccæ* var. *navajo* Skinner, described in the July number of Entomological News for the present year. It is found near Fort Wingate, New Mexico. It is like *yuccæ* and *yuccæ coloradensis* except that it is black in color.

Erycides amyntas arizonensis n. var. Same size and with the same translucent spots in primaries as in *amyntas*, but the ground color of the wings is of a much lighter color. There is a submarginal band of spots on the secondaries and an inner band (or large spot) in the discal area. On the underside the ground color is also much lighter than in *amyntas*, and the two bands across the secondaries are markedly differentiated from the background. This is a pale desert form apparently. Described from a number of specimens from Florence, Arizona, taken September 3rd (C. R. Biederman).